

trains from end to end of its line." We are officially informed that a survey of the line between Fort William & Winnipeg is being made with the three-fold object of reducing grades, easing curves and double-tracking, & inasmuch as the engineers have practically only begun the survey & have not presented any report, the article quoted is, to say the least, premature. (Feb., pg. 39.)

McGregor-Varcoe Branch.—On May 5 we were advised that track-laying on the 28 miles from McGregor towards Varcoe, which was graded last year, would be commenced as soon as possible, but that nothing had been decided on in regard to any further grading this year. (Feb., pg. 39.)

Pipestone Branch Extension.—A recent press despatch from Regina, Assa., said information had reached there from a trustworthy source, that the Co. would at once continue the Pipestone branch up to that town. As stated in our last issue, it is the intention to continue the branch this year to a point between Arcola & Clair, Assa., south of Moose Mountain, but we have been unable to find any authority for the statement that the line will be continued further, or on to Regina, this year. (April, pg. 110.)

Crow's Nest Pass Ry.—A report made by G. R. L. Fellows, Superintending Engineer of this line for the Dominion Department of Railways, on the work done last year, contains some interesting information. Following are extracts: "The second division of the contract, which requires that portion of the line from the south end of Kootenay Lake to Nelson, B.C., to be built before Dec. 31, 1900, was not sufficiently revised in its location to warrant the work being put under contract construction & owing as well to the wet & stormy effects of the past spring & summer weather on the constructed portions of the line, necessitating the holding of all labor to finish & give increased strength to the roadbed, so as to put it beyond all possibility of disturbance from such extraordinary severe rains as has this year been experienced, the consensus of opinion giving a decade to such visitations. Since my last annual report, the finishing up of the work of construction has been vigorously carried on in the face of trying weather, it being nearly continuous into Sept. Following are some of the results of the season's work: Previous to my last annual report the line & its sidings had rails laid over it from Lethbridge to Kootenay Lake, 26% being 73 lbs. to the lineal yard, & the balance 56 & 60 lbs. This year the Co. has laid steel guard rails around maximum curves which terminated or ran on to bridges & trestles. Three trestle bridges have been added to the structures required to pass extreme freshet water, between Pincher & Cowley sidings. In a number of cases extra end bracing of trestles has been done in addition to the standard design requirements, as well as being increased in length where the ends of embankments had suffered from rain, scour & shrinkage. The concrete to support Howe truss span bridges, as well as where it is used in guard piers & river ice-breakers, has shown no weakness or unstable qualities at any point. The bridges yet to be permanently supported with this artificial stone are well

advanced; their completion before the end of the season is practically assured. Permanent riprapping of all concrete structures is going on, those in the larger rivers having been attended to & now about completed. I am pleased to say that under this year's (1899) severe test, have any of the culverts, trestles or bridges failed to do their designed work. The last of the temporary trestle filling, which is at the east approach of the Elk River bridge, is well advanced & nearing completion. A commencement has been made at the filling in of permanent trestles. Where some of them are used, the original surface of the depression crossed has had the appearance of natural drainage, but having been severely tested during the year & given no sign of drainage being required, the Co. is filling them in, the desire being to make as much solid embankment as it is possible to build. Where temporary trestles have been filled, the embankments are being made much wider than is required in the contract, the ballasting as the consolidating goes on being very full. This work is in progress & about completed.

added during the season are oil buildings, sand houses, well equipped with drying apparatus. Supply railway store buildings & large commodious boarding houses have been put up, all of them being attractive in design & creditable in all respects. The requirements, as specified in the contract for buildings, have been more than filled over this line.

"As the rise in the water of Kootenay Lake, in extreme years, has been known to reach 32 ft. from its low water stage, the Co. has driven cluster piles on the upper side of the trestling that carries the line across the south end of the lake to its western terminus, so as to prevent the structural work being reached by any drift wood or floating objectional bodies. This system of protection has been used liberally around the ends & approaches of the transfer slip, which is situated at the main channel of the river discharge, with satisfactory success. In excess of the stipulated clearing, according to contract, already done, the Co. has cut down during the past season various areas of timber at several points, over soils that are composed of clay gumbo, which

is near & extends across the line of railway. This was done with a view of lessening the severe action of a sudden freshet, by giving the Chinook winds full play to minimize the depth of snow during the winter months, thereby leaving very little to be removed when the melting weather occurred. Experience, owing to the severity of rains that this newly constructed railway has been subjected to, has shown the necessity of changing the prism side lines in similar soils where the physical features are different as they are on this long line of prairie & mountain railway. The reducing of slopes & making wider bases in cuttings, now about completed, necessitated during the past season the concentration of almost all available labour at this work, as well as at the road-bed proper, when composed of light prairie or clay gumbo soils. Although the season's work has been an expensive one, carrying on this work, it has resulted in the embankments being strongly consolidated having extra width, better



UPPER GATES ON LOCK 24, NEW WELLAND CANAL, THE SCENE OF THE DYNAMITE OUTRAGE ON APRIL 21, SHOWING WATER RUSHING THROUGH THE BREACH CAUSED BY THE DYNAMITE, AND REPAIRS COMMENCED.

At all points near the Michel Creeks, Elk River & Duck Lake embankments that were likely to be touched by extreme high water, strong riprapping made from the large boulders that have accumulated in coarse gravel cuttings, and which were drawn to the work by train service, has been built during the season.

"All passenger stations, sectionmen's houses, repair & machine buildings are well designed & suitable for an enlarged traffic. Elevated coal pocketed chutes & water tanks of 40,000 galls. capacity have been built at terminal points that are much beyond the present needs, in anticipation of an increased traffic. Large ice-houses were erected & filled during the past season. They store ice in quantities that cannot be used should the business of the road increase to four times its present volume. Additional freight sheds have been built to accommodate the fast increasing requirements demanded at established growing centres. The line is now fully served at the terminal points with the best standard turntables, as well as having auxiliary turning locations served with wyes. Among the appurtenances

slopes than diagram lines asked for in the contract, with the formation bases liberally covered with ballast & to a much greater depth than specified in the agreement. Among some of the various soils that the cuttings have been made through, flatter slopes have had to be given to ensure permanent solidity & safety. Between Lethbridge & Macleod the cemented material that had to be blasted owing to its hard & compact nature has stood well with its sharper slopes than $1\frac{1}{2}$ to 1, the only weakness shown being in the loosened & fractured portions caused by the dynamite when liberating the prism contents, which eroded slightly through the force of the rain storms, the cleaning up of which was satisfactorily completed during the past season.

"In all cuttings east of the Crow's Nest station, where composed of firm, dry compact soil, the slopes that were taken out less than the general slope of $1\frac{1}{2}$ to 1, have where they seemed weak been flattened and put beyond doubt as to their security and permanency. At present between Pincher and Cowley stations an outcrop of treacherous clay in the cuttings west of the South Fork of the Old